

REMARKS

The last Office Action of August 6, 2008 has been carefully considered. Reconsideration of the instant application in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 2-4, 7-21, 26 and 31 are pending in the application. Claim 9 has been amended for clarity only. No claims have been canceled or added. No amendment to the specification has been made. No fee is due.

Claims 26 and 31 stand rejected under 35 U.S.C. 102(b) as being anticipated by Kuckes '755 (US Patent No. 5,258,755).

Claims 2-3, 7-9, 12-14 and 17-20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kuckes'755 and further in view of Haynor'230 et al. (US Patent No. 6,263,230 B1).

REJECTION UNDER 35 U.S.C. §102(b)

The rejection under 35 U.S.C. 102(b) is respectfully traversed.

Applicant has amended claim 9 to more clearly set forth the subject matter of the invention. These changes to claim 9 are cosmetic in nature and should not be considered as a narrowing amendment to trigger prosecution history estoppel.

Kuckes '755 discloses a device for localizing a drill assembly, wherein the time-varying magnetic field of a rotating dipole is measured and evaluated with a magnetometer for determining the position of the dipole and thereby also the position of the assembly. In the embodiment described in Kuckes '755, the permanent magnet 40 is rotated while fixedly attached to the housing (see col. 3, lines 10-13; col. 5, lines 68 to col. 6, line 4). The roll angle is here measured by using additional tilt sensors 64, 64' (see col. 8, line 81, to col. 9, line 5).

Kuckes '755 further discloses (col. 10, lines 46-50) that the permanent magnet 40 can also be rotatably driven independent of the drill assembly. In this embodiment, the roll angle must also be determined with the tilt sensors 64, 64'.

The device disclosed in Kuckes '755 includes two magnetic field sources (see claim 1). The first magnetic field source is a coil 46 fixedly arranged inside the housing and transmitting a magnetic field along the longitudinal axis. The second magnetic field source is the aforescribed rotating permanent magnet 40 which produces a magnetic field oriented perpendicular to the magnetic field produced by the coil 46. It is disclosed in col. 9, lines 43 to 46, that to produce a time-varying magnetic field a pulsed voltage can be applied to the coil 46. This examiner relies on this text passage to allege lack of novelty of claims 26 and 31. However, it must be emphasized that the modulation of the magnetic field described in Kuckes '755 relates to the coil 46, and not to a modulation of the magnetic field of the rotating permanent magnet 40.

Kuckes '755 further discloses an alternative use of the device for localization of a drill assembly (col. 10, line 55, to col. 11, line 9). This section describes an automatic landing system for aircraft. The landing system includes two magnetic field sources arranged in the area of the runway. The magnetometer for measuring the magnetic fields is here arranged in the aircraft. Kuckes '755 also discloses that the landing system does not employ a rotating permanent magnet 40, and uses instead an electrically excited magnetic field source (see col. 10, lines 63-66). Because the magnetic field sources are positioned in the area of the runway, it is proposed to compensate interfering magnetic earth fields.

In summary, applicant emphasizes that Kuckes '755 does not additionally vary the magnetic field of the rotating permanent magnet 40. More particularly, Kuckes '755 does not disclose to modulate the rotation frequency of the permanent magnet. Accordingly, the three independent claims 9, 26 and 31 are novel in view of Kuckes '755.

Moreover, because Kuckes '755 does not disclose the additional modulation of the magnetic field of the rotating permanent magnet, Kuckes '755 also fails to disclose that this additional modulation can be related to the roll angle of the housing (additional feature of claim 9).

In addition, because Kuckes '755 does not disclose frequency modulation of

the rotating permanent magnet, there is no teaching in Kuckes '755 that the magnetic field produced by the permanent magnet can be used to differentiate against another magnetic field or to minimize the influence of an external magnetic field (additional feature of the claims 26 and 31).

Withdrawal of the rejection under 35 U.S.C. §102(b) is thus respectfully requested.

REJECTION UNDER 35 U.S.C. §103(a)

The device of the invention measures not only the position, but also the roll angle of the device by using a single rotating permanent magnet.

Determination of the roll angle is generally no problem as long as the rotation of the permanent magnet is coupled to the rotation of the device. As already discussed above, such coupling is provided in one of the embodiments disclosed in Kuckes '755, in that the permanent magnet 40 is fixedly attached to the housing and rotates with the housing (see col. 3, lines 10-13; col. 5, line 68 to col. 6, line 4). Kuckes '755 determines the roll angle with additional tilt sensors 64, 64' (see col. 8, line 61, to col. 9, line 5), as discussed above, when the permanent magnet 40 is no longer coupled to the rotation of the device, but is rotatably driven independent of the device, which Kuckes '755 discloses as an alternative embodiment (see col. 10, lines 46-50). The roll angle of the device can generally no longer be determined when the rotation of the permanent magnet and therefore the position of the changing magnetic field lacks a defined relationship with the rotation of the device (i.e., the roll angle).

The Examiner asserts that the feature of the invention, namely determining the roll angle of a permanent magnet which rotates independent of the device by periodically changing the rotation frequency of the magnetic dipole, is obvious from a combination of the teachings of Kuckes '755 and Haynor.

However, the Examiner fails to recognize that Kuckes '755, as already discussed above, fails to disclose changing the rotation frequency of the permanent

magnet 40, or determining the roll angle by periodically changing the rotation frequency with respect to the housing of the device. Haynor also fails to disclose these features missing from Kuckes '755.

Haynor discloses a device for localizing a medical sensor inserted in the body of a patient. Three permanent magnets are arranged on the sensor which generate magnetic fields oriented orthogonally to one another. For determining the position, the three magnetic fields are measured with an external magnetometer, from which the position of the sensor in the body of the patient is calculated. Haynor also addresses measuring the roll angle of the sensor. As disclosed in col. 26, starting at line 29, by fixedly positioning the permanent magnet in the sensor, the angle of the magnetic field generated by the permanent magnet can in principle be determined. It should be noted, however, that the roll angle cannot be uniquely determined by using a single permanent magnet, because the magnetic field emitted by a permanent magnet is symmetric. The orientation of the magnetic field is therefore ambiguous due to the symmetry of the magnetic field, so that it cannot be determined by using a single permanent magnet, if the sensor has, for example, a roll angle of 0° or 180°, of 90° or 270°, etc. Due to this ambiguity, Haynor proposes (col. 26, starting at line 42) to fixedly arrange at least two permanent magnets inside the sensor, whereby their longitudinal axes must not be coaxial. The roll angle of the sensor can then be unambiguously determined by a combined evaluation of the two generated magnetic fields.

Accordingly, Haynor fails to disclose the features missing in Kuckes '755, namely that the rotation frequency of a single permanent magnet which rotates independent of the device, is periodically modulated, i.e., changed, with a defined relation to the device, in order to establish a defined relationship with the roll angle of the device and to thereby determined the roll angle with a magnetometer.

For the reasons set forth above, it is applicant's contention that neither Kuckes '755 nor Haynor, nor a combination thereof teaches or suggests the features of the present invention, as recited in claims 9, 26 and 31.

As for the rejection of the dependent claims, these claims depend on claim 9,

share its presumably allowable features, and therefore it is respectfully submitted that these claims should also be allowed.

Withdrawal of the rejection under 35 U.S.C. §103(a) is thus respectfully requested.

CONCLUSION

Applicant believes that when reconsidering the claims in the light of the above comments, the Examiner will agree that the invention is in no way properly met or anticipated or even suggested by any of the references however they are considered.

In view of the above presented remarks and amendments, it is respectfully submitted that all claims on file should be considered patentably differentiated over the art and should be allowed.

Reconsideration and allowance of the present application are respectfully requested.

Should the Examiner consider necessary or desirable any formal changes anywhere in the specification, claims and/or drawing, then it is respectfully requested that such changes be made by Examiner's Amendment, if the Examiner feels this would facilitate passage of the case to issuance. If the Examiner feels that it might be helpful in advancing this case by calling the undersigned, applicant would greatly appreciate such a telephone interview.

Respectfully submitted,

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